

A.2.5 Cosmic Ray Physics

1. Scope of Program

A. Cosmic Ray Physics Experimental Program.

This experimental program supports studies of the origin, acceleration, and transport of galactic cosmic rays. Fundamental measurements include the elemental abundance, isotopic composition, and energy spectra of galactic cosmic rays, as well as antimatter, exotic particles, and dark matter to provide tests of cosmological models. This experimental research program primarily supports science investigations utilizing large stratospheric balloons to carry instruments above about 99% of the Earth's atmosphere. It also supports the exploration and demonstration of new instrument concepts pertinent to the science goals of the discipline. The balloon payloads funded over the past decade have been similar in many respects to space flight instruments for a focused science investigation (e.g., level of technological sophistication, management approach, etc.). In fact, the term "balloon mission" would be appropriate for describing several of the investigations that have been supported.

This program will undergo a comprehensive review in 1998 in response to this NRA, with the intent to support a balanced experimental program in cosmic ray astrophysics research. Note, however, that only a fraction of the balloon investigations selected as a result of the last major review of this program in 1995 is reaching a natural completion in FY 1998. Therefore, most of the available funds in FY 1999 will be required to continue the development and observational phases of the ongoing projects, subject, of course, to their receiving high rating in the peer review. It is estimated that less than \$1M will be available in FY 1999 for starting new research projects. All projects selected under this NRA must demonstrate high scientific merit and a credible development plan for rapid completion. Preference will also be given to investigations that promise rapid dissemination of results and incorporate new technological developments.

The current fiscal climate and budget pressures demand that the total life-cycle costs of all flight projects be known, including the costs through publication of the results even if those publications may not occur within the nominal three-year award. The annual funding needs, the total project cost, the performance on recent, prior investigations (if applicable), and the extent to which an investigation contributes to the U.S. technological capability will be major factors in continuing ongoing projects and in selecting new investigations in response to this NRA. All proposed investigations should include a viable schedule, a cost plan, a management plan, and the anticipated balloon flight requirements to carry the proposed project, new or ongoing, to completion. Serious consideration will be given to providing a tentative commitment to fund selected projects to completion, up to a maximum of five years, contingent upon detailed progress reports and interim reviews that indicate continued funding is warranted. However, the total out-

year commitments, even though they are only tentative, must still allow for a stimulating future program of new investigations within budget constraints.

Owing to the greater degree of complexity of the proposals expected for this Cosmic Ray Experimental Program, the *Science/Technical/Management* section of the proposals may be 20 pages long instead of the default 15 pages specified in Section 5.1 of Appendix C.

B. Cosmic-Ray Theory and Data Analysis Program

Note that theoretical investigations of galactic cosmic rays should be submitted to the Astrophysics Theory Program (ATP) element described in Section A.2.6 of this Appendix A, while investigators interested in proposing to the Advanced Composition Explorer (ACE) Guest Investigator Program should see Section A.4.7.

2. Programmatic Considerations

The schedules for submission of the Notice of Intent and proposal are given in Table 1 of the cover letter of this NRA. The World Wide Web site for submitting both the NOI and the *Cover Page/Proposal Summary* (see Appendix C.5.3) is

<<http://props.oss.hq.nasa.gov>>; proposers without access to the Web or who experience difficulty in using this site may contact Ms. Debra Tripp (E-mail: deb.tripp@hq.nasa.gov) for assistance. Hard copies of the proposals are to be delivered to:

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Cosmic Ray Physics

Jorge Scientific Corporation

Suite 700

400 Virginia Avenue, SW

Washington, DC 20024

Phone number for commercial delivery: (202) 554-2775

Question concerning this program element may be addressed to the Discipline Scientist:

Dr. W. Vernon Jones

Research Program Management Division

Code SR

Office of Space Science

NASA Headquarters

Washington DC 20546-0001

Telephone: (202) 358-0885

Fax: (202) 358-3097

E-mail: wvjones@hq.nasa.gov